

Calendar No. 141

105TH CONGRESS  
1ST Session

**S. 910**

[Report No. 105-59]

**A BILL**

To authorize appropriations for carrying out the Earthquake Hazards Reduction Act of 1977 for fiscal years 1998 and 1999, and for other purposes.

JULY 30, 1997

Reported with an amendment in the nature of a substitute

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1ST SESSION**S. 910****[Report No. 105-59]**

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IN THE SENATE OF THE UNITED STATES

JUNE 16, 1997

Mr. FRIST introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

JULY 30, 1997

Reported by Mr. MCCAIN, with an amendment in the nature of a substitute  
[Strike all after the enacting clause and insert the part printed in *italic*]

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**A BILL**

To authorize appropriations for carrying out the Earthquake Hazards Reduction Act of 1977 for fiscal years 1998 and 1999, and for other purposes.

1       *Be it enacted by the Senate and House of Representa-*  
2       *tives of the United States of America in Congress assembled,*

3       **SECTION 1. AUTHORIZATION OF APPROPRIATIONS.**

4       ~~Section 12 of the Earthquake Hazards Reduction Act~~  
5       ~~of 1977 (42 U.S.C. 7706) is amended—~~

1           (1) in subsection (a)(7)—

2                   (A) by striking “and” after “1995,”; and

3                   (B) by inserting before the period at the  
4           end the following: “, \$19,228,000 for the fiscal  
5           year ending September 30, 1998, and  
6           \$19,804,000 for the fiscal year ending Septem-  
7           ber 30, 1999”;

8           (2) in subsection (b)—

9                   (A) by striking “and” after “September  
10           30, 1995,”;

11                  (B) by inserting before the period at the  
12           end the following: “, \$51,142,000 for the fiscal  
13           year ending September 30, 1998, and  
14           \$52,676,000 for the fiscal year ending Septem-  
15           ber 30, 1999”;

16           (3) in subsection (c)—

17                   (A) by striking “and” at the end of para-  
18           graph (1); and

19                   (B) by inserting before the period at the  
20           end the following: “, (3) \$18,450,000 for engi-  
21           neering research and \$11,920,000 for geo-  
22           sciences research for the fiscal year ending Sep-  
23           tember 30, 1998, and (4) \$19,000,000 for engi-  
24           neering research and \$12,280,000 for geo-

sciences research for the fiscal year ending September 30, 1999”; and

(4) in the last sentence of subsection (d)—

(A) by striking “and” after “September 30, 1995,”; and

(B) by inserting before the period at the end the following: “, \$2,000,000 for the fiscal year ending September 30, 1998, and \$2,060,000 for the fiscal year ending September 30, 1999”.

**SEC. 2. REAL-TIME SEISMIC HAZARD WARNING SYSTEM DEVELOPMENT AND PHASED DEPLOYMENT.**

(a) **AUTOMATIC SEISMIC WARNING SYSTEM DEVELOPMENT AND PHASED DEPLOYMENT.**—

(1) **DEFINITIONS.**—In this section:

(A) **DIRECTOR.**—The term “Director” means the Director of the United States Geological Survey.

(B) **HIGH-RISK ACTIVITY.**—The term “high-risk activity” means an activity that may be adversely affected by a moderate to severe seismic event (as determined by the Director). The term includes high-speed rail transportation.

1           (C) REAL-TIME SEISMIC WARNING SYS-  
2           TEM.—The term “real-time seismic warning  
3           system” means a system that issues warnings  
4           in real-time from a network of seismic sensors  
5           to a set of analysis processors, directly to re-  
6           ceivers related to high-risk activities.

7           (2) IN GENERAL.—The Director shall conduct a  
8           program to develop and deploy a real-time seismic  
9           warning system. The Director may use funds made  
10          available to the Director pursuant to this section to  
11          provide for a joint program with an entity that the  
12          Director determines to be appropriate to develop and  
13          deploy a real-time seismic warning system. The Di-  
14          rector may enter into such agreements or contracts  
15          as may be necessary to carry out the program.

16          (3) UPGRADE OF SEISMIC SENSORS.—In carry-  
17          ing out a program under paragraph (2), in order to  
18          increase the accuracy and speed of seismic event  
19          analysis to provide for timely warning signals, the  
20          Director shall provide for the upgrading of the net-  
21          work of seismic sensors in existence at the time of  
22          the establishment of the program to increase the ca-  
23          pability of the sensors—

1           (A) to measure accurately large magnitude  
2 seismic events (as determined by the Director);  
3 and

4           (B) to acquire additional parametric data.

5           (4) DEVELOPMENT OF COMMUNICATIONS AND  
6 COMPUTATION INFRASTRUCTURE.—In carrying out a  
7 program under paragraph (2), the Director shall de-  
8 velop a communications and computation infrastruc-  
9 ture that is necessary—

10           (A) to process the data obtained from the  
11 upgraded seismic sensor network referred to in  
12 paragraph (3); and

13           (B) to provide for, and carry out, such  
14 communications engineering and development  
15 as is necessary to facilitate—

16           (i) the timely flow of data within a  
17 real-time seismic hazard warning system;  
18 and

19           (ii) the issuance of warnings to receiv-  
20 ers related to high-risk activities.

21           (5) PROCUREMENT OF COMPUTER HARDWARE  
22 AND COMPUTER SOFTWARE.—In carrying out a pro-  
23 gram under paragraph (2), the Director shall pro-  
24 cure such computer hardware and computer soft-  
25 ware as may be necessary to carry out the program.

(6) REPORTS ON PROGRESS.—

(A) IN GENERAL.—Not later than 120 days after the date of enactment of this Act, the Director shall prepare and submit to Congress a report that contains a plan for implementing a real-time seismic hazard warning system.

(B) ADDITIONAL REPORTS.—Not later than 1 year after the date on which the Director submits the report under subparagraph (A), and annually thereafter, the Director shall prepare and submit to Congress a report that summarizes the progress of the Director in implementing the plan referred to in subparagraph (A).

(7) AUTHORIZATION OF APPROPRIATIONS.—In addition to the amounts made available to the Director under section 12(b) of the Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7706(b)), there are authorized to be appropriated to the Department of the Interior, to be used by the Director to carry out this section, \$10,000,000 for each of fiscal years 1998 and 1999.

(b) EARTH SCIENCE TEACHING MATERIALS.—

(1) DEFINITIONS.—In this subsection:

1           (A) LOCAL EDUCATIONAL AGENCY.—The  
 2           term “local educational agency” has the mean-  
 3           ing given that term in section 14101 of the Ele-  
 4           mentary and Secondary Education Act of 1965  
 5           (20 U.S.C. 8801).

6           (B) SCHOOL.—The term “school” means a  
 7           nonprofit institutional day or residential school  
 8           that provides education for any of the grades  
 9           kindergarten through grade 12.

10          (2) TEACHING MATERIALS.—In a manner con-  
 11          sistent with the requirement under section  
 12          5(b)(4)(B) of the Earthquake Hazards Reduction  
 13          Act of 1977 (42 U.S.C. 7704(b)(4)(B)) and subject  
 14          to a merit based competitive process, the Director of  
 15          the National Science Foundation may use funds  
 16          made available to the Director under section 12(c)  
 17          of such Act (42 U.S.C. 7706(c)) to develop, and  
 18          make available to schools and local educational agen-  
 19          cies for use by schools, at a minimal cost, earth  
 20          science teaching materials that are designed to meet  
 21          the needs of elementary and secondary school teach-  
 22          ers and students.

23          (c) IMPROVED SEISMIC HAZARD ASSESSMENT.—

24               (1) IN GENERAL.—As soon as practicable after  
 25          the date of enactment of this Act, the Director shall



1       conduct a project to improve the seismic hazard as-  
 2       sessment of the seismic zone in East Tennessee that  
 3       is described in paragraph (2).

4           (2) EAST TENNESSEE SEISMIC ZONE.—The  
 5       seismic zone described in this paragraph is the seis-  
 6       mic zone located in East Tennessee, that underlies  
 7       the Oak Ridge National Laboratory in Oak Ridge,  
 8       Tennessee and the Watts Bar nuclear plant that is  
 9       operated by the Tennessee Valley Authority.

10       (3) REPORTS.—

11           (A) IN GENERAL.—Not later than 1 year  
 12       after the date of enactment of this Act, and an-  
 13       nually during the period of the assessment, the  
 14       Director shall prepare, and submit to Congress  
 15       a report on the findings of the assessment.

16           (B) FINAL REPORT.—Not later than 60  
 17       days after the date of termination of the assess-  
 18       ment conducted under this subsection, the Di-  
 19       rector shall prepare and submit to Congress a  
 20       report concerning the findings of the assess-  
 21       ment.

22       (4) AUTHORIZATION OF APPROPRIATIONS.—In  
 23       addition to the amounts made available to the Direc-  
 24       tor under section 12(b) of the Earthquake Hazards  
 25       Reduction Act of 1977 (42 U.S.C. 7706(b)), there

1 are authorized to be appropriated to the Department  
 2 of the Interior, to be used by the Director to carry  
 3 out this section—

4 (A) \$700,000 for fiscal year 1998; and

5 (B) \$1,000,000 for fiscal year 1999.

6 **SECTION 1. AUTHORIZATION OF APPROPRIATIONS.**

7 *Section 12 of the Earthquake Hazards Reduction Act*  
 8 *of 1977 (42 U.S.C. 7706) is amended—*

9 (1) *in subsection (a)(7)—*

10 (A) *by striking “and” after “1995,”; and*

11 (B) *by inserting before the period at the end*  
 12 *the following: “, \$20,900,000 for the fiscal year*  
 13 *ending September 30, 1998, and \$21,500,000 for*  
 14 *the fiscal year ending September 30, 1999”;*

15 (2) *in subsection (b)—*

16 (A) *by striking “and” after “September 30,*  
 17 *1995,”;*

18 (B) *by inserting before the period at the end*  
 19 *the following: “; \$51,142,000 for the fiscal year*  
 20 *ending September 30, 1998 of which \$3,800,000*  
 21 *shall be used for the Global Seismic Network op-*  
 22 *erated by the Agency; and \$52,676,000 for the*  
 23 *fiscal year ending September 30, 1999, of which*  
 24 *\$3,800,000 shall be used for the Global Seismic*  
 25 *Network operated by the Agency”;* and

1                   (C) by adding at the end the following: “Of  
 2                   the amounts authorized to be appropriated under  
 3                   this subsection, at least—

4                   “(1) \$8,000,000 of the amount authorized to be  
 5                   appropriated for the fiscal year ending September 30,  
 6                   1998; and

7                   “(2) \$8,250,000 of the amount authorized for the  
 8                   fiscal year ending September 30, 1999,  
 9                   shall be used for carrying out a competitive, peer-reviewed  
 10                  program under which the Director, in close coordination  
 11                  with and as a complement to related activities of the United  
 12                  States Geological Survey, awards grants to, or enters into  
 13                  cooperative agreements with, State and local governments  
 14                  and persons or entities from the academic community and  
 15                  the private sector.”;

16                  (3) in subsection (c)—

17                         (A) by striking “and” after “September 30,  
 18                         1995,”; and

19                         (B) by inserting before the period at the end  
 20                         the following: “, (3) \$18,450,000 for engineering  
 21                         research and \$11,920,000 for geosciences research  
 22                         for the fiscal year ending September 30, 1998,  
 23                         and (4) \$19,000,000 for engineering research and  
 24                         \$12,280,000 for geosciences research for the fiscal  
 25                         year ending September 30, 1999”; and

1 (4) *in the last sentence of subsection (d)—*

2 (A) *by striking “and” after “September 30,*  
 3 *1995,”; and*

4 (B) *by inserting before the period at the end*  
 5 *the following: “, \$2,000,000 for the fiscal year*  
 6 *ending September 30, 1998, and \$2,060,000 for*  
 7 *the fiscal year ending September 30, 1999”.*

8 **SEC. 2. AUTHORIZATION OF REAL-TIME SEISMIC HAZARD**  
 9 **WARNING SYSTEM DEVELOPMENT, AND**  
 10 **OTHER ACTIVITIES.**

11 (a) *AUTOMATIC SEISMIC WARNING SYSTEM DEVELOP-*  
 12 *MENT.—*

13 (1) *DEFINITIONS.—In this section:*

14 (A) *DIRECTOR.—The term “Director”*  
 15 *means the Director of the United States Geologi-*  
 16 *cal Survey.*

17 (B) *HIGH-RISK ACTIVITY.—The term “high-*  
 18 *risk activity” means an activity that may be ad-*  
 19 *versely affected by a moderate to severe seismic*  
 20 *event (as determined by the Director). The term*  
 21 *includes high-speed rail transportation.*

22 (C) *REAL-TIME SEISMIC WARNING SYS-*  
 23 *TEM.—The term “real-time seismic warning sys-*  
 24 *tem” means a system that issues warnings in*  
 25 *real-time from a network of seismic sensors to a*

1           *set of analysis processors, directly to receivers re-*  
2           *lated to high-risk activities.*

3           (2) *IN GENERAL.—The Director shall conduct a*  
4           *program to develop a prototype real-time seismic*  
5           *warning system. The Director may enter into such*  
6           *agreements or contracts as may be necessary to carry*  
7           *out the program.*

8           (3) *UPGRADE OF SEISMIC SENSORS.—In carry-*  
9           *ing out a program under paragraph (2), in order to*  
10          *increase the accuracy and speed of seismic event anal-*  
11          *ysis to provide for timely warning signals, the Direc-*  
12          *tor shall provide for the upgrading of the network of*  
13          *seismic sensors participating in the prototype to in-*  
14          *crease the capability of the sensors—*

15                 *(A) to measure accurately large magnitude*  
16                 *seismic events (as determined by the Director);*  
17                 *and*

18                 *(B) to acquire additional parametric data.*

19           (4) *DEVELOPMENT OF COMMUNICATIONS AND*  
20           *COMPUTATION INFRASTRUCTURE.—In carrying out a*  
21           *program under paragraph (2), the Director shall de-*  
22           *velop a communications and computation infrastruc-*  
23           *ture that is necessary—*

(A) to process the data obtained from the upgraded seismic sensor network referred to in paragraph (3); and

(B) to provide for, and carry out, such communications engineering and development as is necessary to facilitate—

(i) the timely flow of data within a real-time seismic hazard warning system; and

(ii) the issuance of warnings to receivers related to high-risk activities.

(5) *PROCUREMENT OF COMPUTER HARDWARE AND COMPUTER SOFTWARE.*—In carrying out a program under paragraph (2), the Director shall procure such computer hardware and computer software as may be necessary to carry out the program.

(6) *REPORTS ON PROGRESS.*—

(A) *IN GENERAL.*—Not later than 120 days after the date of enactment of this Act, the Director shall prepare and submit to Congress a report that contains a plan for implementing a real-time seismic hazard warning system.

(B) *ADDITIONAL REPORTS.*—Not later than 1 year after the date on which the Director submits the report under subparagraph (A), and an-

1 *nually thereafter, the Director shall prepare and*  
 2 *submit to Congress a report that summarizes the*  
 3 *progress of the Director in implementing the*  
 4 *plan referred to in subparagraph (A).*

5 *(7) AUTHORIZATION OF APPROPRIATIONS.—In*  
 6 *addition to the amounts made available to the Direc-*  
 7 *tor under section 12(b) of the Earthquake Hazards*  
 8 *Reduction Act of 1977 (42 U.S.C. 7706(b)), there are*  
 9 *authorized to be appropriated to the Department of*  
 10 *the Interior, to be used by the Director to carry out*  
 11 *paragraph (2), \$3,000,000 for each of fiscal years*  
 12 *1998 and 1999.*

13 *(b) SEISMIC MONITORING NETWORKS ASSESSMENT.—*

14 *(1) IN GENERAL.—The Director shall provide for*  
 15 *an assessment of regional seismic monitoring net-*  
 16 *works in the United States. The assessment shall ad-*  
 17 *dress—*

18 *(A) the need to update the infrastructure*  
 19 *used for collecting seismological data for research*  
 20 *and monitoring of seismic events in the United*  
 21 *States;*

22 *(B) the need for expanding the capability to*  
 23 *record strong ground motions, especially for*  
 24 *urban area engineering purposes;*

1           (C) the need to measure accurately large  
2           magnitude seismic events (as determined by the  
3           Director);

4           (D) the need to acquire additional paramet-  
5           ric data; and

6           (E) projected costs for meeting the needs de-  
7           scribed in subparagraphs (A) through (D).

8           (2) *RESULTS.*—The Director shall transmit the  
9           results of the assessment conducted under this sub-  
10          section to Congress not later than 1 year after the  
11          date of enactment of this Act.

12          (c) *EARTH SCIENCE TEACHING MATERIALS.*—

13           (1) *DEFINITIONS.*—In this subsection:

14           (A) *LOCAL EDUCATIONAL AGENCY.*—The  
15           term “local educational agency” has the meaning  
16           given that term in section 14101 of the Elemen-  
17           tary and Secondary Education Act of 1965 (20  
18           U.S.C. 8801).

19           (B) *SCHOOL.*—The term “school” means a  
20           nonprofit institutional day or residential school  
21           that provides education for any of the grades  
22           kindergarten through grade 12.

23           (2) *TEACHING MATERIALS.*—In a manner con-  
24           sistent with the requirement under section 5(b)(4) of  
25           the Earthquake Hazards Reduction Act of 1977 (42



1     *U.S.C. 7704(b)(4)) and subject to a merit based com-*  
 2     *petitive process, the Director of the National Science*  
 3     *Foundation may use funds made available to him or*  
 4     *her under section 12(c) of such Act (42 U.S.C.*  
 5     *7706(c)) to develop, and make available to schools*  
 6     *and local educational agencies for use by schools, at*  
 7     *a minimal cost, earth science teaching materials that*  
 8     *are designed to meet the needs of elementary and sec-*  
 9     *ondary school teachers and students.*

10    *(d) IMPROVED SEISMIC HAZARD ASSESSMENT.—*

11           *(1) IN GENERAL.—As soon as practicable after*  
 12     *the date of enactment of this Act, the Director shall*  
 13     *conduct a project to improve the seismic hazard as-*  
 14     *essment of seismic zones.*

15           *(2) REPORTS.—*

16           *(A) IN GENERAL.—Not later than 1 year*  
 17     *after the date of enactment of this Act, and an-*  
 18     *nually during the period of the project, the Di-*  
 19     *rector shall prepare, and submit to Congress, a*  
 20     *report on the findings of the project.*

21           *(B) FINAL REPORT.—Not later than 60*  
 22     *days after the date of termination of the project*  
 23     *conducted under this subsection, the Director*  
 24     *shall prepare and submit to Congress a report*  
 25     *concerning the findings of the project.*

1       (e) *STUDY OF NATIONAL EARTHQUAKE EMERGENCY*  
2 *TRAINING CAPABILITIES.*—

3           (1) *IN GENERAL.*—*The Director of the Federal*  
4 *Emergency Management Agency shall conduct an as-*  
5 *essment of the need for additional Federal disaster-*  
6 *response training capabilities that are applicable to*  
7 *earthquake response.*

8           (2) *CONTENTS OF ASSESSMENT.*—*The assessment*  
9 *conducted under this subsection shall include—*

10           (A) *a review of the disaster training pro-*  
11 *grams offered by the Federal Emergency Man-*  
12 *agement Agency at the time of the assessment;*

13           (B) *an estimate of the number and types of*  
14 *emergency response personnel that have, during*  
15 *the period beginning on January 1, 1990 and*  
16 *ending on July 1, 1997, sought the training re-*  
17 *ferred to in subparagraph (A), but have been un-*  
18 *able to receive that training as a result of the*  
19 *oversubscription of the training capabilities of*  
20 *the Federal Emergency Management Agency;*  
21 *and*

22           (C) *a recommendation on the need to pro-*  
23 *vide additional Federal disaster-response train-*  
24 *ing centers.*

1           (3) *REPORT*.—Not later than 180 days after the  
 2           date of enactment of this Act, the Director shall pre-  
 3           pare and submit to Congress a report that addresses  
 4           the results of the assessment conducted under this sub-  
 5           section.

6 **SEC. 3. COMPREHENSIVE ENGINEERING RESEARCH PLAN.**

7           (a) *NATIONAL SCIENCE FOUNDATION*.—Section  
 8           5(b)(4) of the *Earthquake Hazards Reduction Act of 1977*  
 9           (42 U.S.C. 7704(b)(4)) is amended—

10           (1) by striking “and” at the end of subpara-  
 11           graph (D);

12           (2) by striking the period at the end of subpara-  
 13           graph (E) and inserting “; and ”; and

14           (3) by adding at the end the following:

15                   “(F) develop, in conjunction with the Fed-  
 16                   eral Emergency Management Agency, the Na-  
 17                   tional institute of Standards and Technology,  
 18                   and the United States Geological Survey, a com-  
 19                   prehensive plan for earthquake engineering re-  
 20                   search to effectively use existing testing facilities  
 21                   and laboratories (in existence at the time of the  
 22                   development of the plan), upgrade facilities and  
 23                   equipment as needed, and integrate new, innova-  
 24                   tive testing approaches to the research infrastruc-  
 25                   ture in a systematic manner.”.

1       (b) *FEDERAL EMERGENCY MANAGEMENT AGENCY.*—  
 2       *Section 5(b)(1) of the Earthquake Hazards Reduction Act*  
 3       *of 1977 (42 U.S.C. 7704(b)(1)) is amended—*

4               (1) *by striking “and” at the end of subpara-*  
 5       *graph (D);*

6               (2) *by striking the period at the end of subpara-*  
 7       *graph (E) and inserting “; and”; and*

8               (3) *by adding at the end the following:*

9                       *“(F) work with the National Science Foun-*  
 10                      *dation, the National institute of Standards and*  
 11                      *Technology, and the United States Geological*  
 12                      *Survey, to develop a comprehensive plan for*  
 13                      *earthquake engineering research to effectively use*  
 14                      *existing testing facilities and laboratories (exist-*  
 15                      *ing at the time of the development of the plan),*  
 16                      *upgrade facilities and equipment as needed, and*  
 17                      *integrate new, innovative testing approaches to*  
 18                      *the research infrastructure in a systematic man-*  
 19                      *ner.”.*

20       (c) *UNITED STATES GEOLOGICAL SURVEY.*—*Section*  
 21       *5(b)(3) of the Earthquake Hazards Reduction Act of 1977*  
 22       *(42 U.S.C. 7704(b)(3)) is amended—*

23               (1) *by striking “and” at the end of subpara-*  
 24       *graph (E);*

(2) *by striking the period at the end of subparagraph (G) and inserting “; and”; and*

(3) *by adding at the end the following:*

*“(H) work with the National Science Foundation, the Federal Emergency Management Agency, and the National Institute of Standards and Technology to develop a comprehensive plan for earthquake engineering research to effectively use existing testing facilities and laboratories (in existence at the time of the development of the plan), upgrade facilities and equipment as needed, and integrate new, innovative testing approaches to the research infrastructure in a systematic manner.”.*

(d) *NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.—Section 5(b)(5) of the Earthquake Hazards Reduction Act of 1977 (42 U.S.C. 7704(b)(5)) is amended—*

(1) *by striking “and” at the end of subparagraph (B);*

(2) *by striking the period at the end of subparagraph (C) and inserting “; and”; and*

(3) *by adding at the end the following:*

*“(D) work with the National Science Foundation, the Federal Emergency Management Agency, and the United States Geological Survey*

1           *to develop a comprehensive plan for earthquake*  
2           *engineering research to effectively use existing*  
3           *testing facilities and laboratories (in existence at*  
4           *the time of the development of the plan), upgrade*  
5           *facilities and equipment as needed, and integrate*  
6           *new, innovative testing approaches to the re-*  
7           *search infrastructure in a systematic manner.”.*

8   **SEC. 4. REPEALS.**

9           *Sections 6 and 7 of the Earthquake Hazards Reduction*  
10   *Act of 1977 (42 U.S.C. 7705 and 7705a) are repealed.*